REPUBLIC OF CYPRUS

MINISTRY OF COMMERCE, INDUSTRY AND TOURISM

1ST PROGRESS REPORT UNDER ARTICLE 22 OF DIRECTIVE 2009/28/EC

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1. Sectoral and overall shares of energy from renewable sources <u>in the preceding two years</u> *(Article 22(1)(a) of Directive 2009/28/EC).*

***Table 1**: The sectoral (electricity, heating and cooling, and transport) and overall shares of energy from renewable sources*

	Year N-2 (2009)	**Year N-1 (2010)**
RES – H&C (%)	**15.6%**	**17.7%**
RES – E (%)	**0.6%**	**1.4%**
RES – T(%)	**2.0%**	**2.0%**
Overall RES share (%) not taking account of the civil aviation limit reduction	**4.8%**	**5.2%**
Total RES share (%) after reduction for civil aviation limit[1]	**5.4%**	**5.8%**
Of which from cooperation mechanism (%)	**0**	**0**
Surplus for cooperation mechanism (%)	**0**	**0**

As shown in Table 1, the Republic of Cyprus, with a 5.8% RES share in the gross final energy consumption, has exceeded since 2010 the indicative trajectory for the period 2011-2012 and is very close to implementing the indicative trajectory for the period 2013-2014, since, pursuant to Annex I to Directive[2] the total renewable energy share in the gross final energy consumption in Cyprus should stand at 4.92% in the 2011-2012 period and at 5.93% in the 2013-2014 period.

[1] Calculation of gross final energy consumption pursuant to Article 5(6).
[2] Directive 2009/20/EC of the European Parliament and of the Council of 23 April 2009.

Table 1a: **Calculation table for the renewable energy contribution of each sector to final energy consumption (ktoe)[3]**

	Year N-2 (2009)	Year N-1 (2010)
(A) Gross final consumption of RES for heating and cooling	77.24	81.25
(B) Gross final consumption of electricity from RES	2.61	6.27
(C) Gross final consumption of energy from RES in transport	15.13	15.05
(D) Gross total RES consumption	94.98	102.57
(E) Transfer of RES to other Member States	0	0
(F) Transfer of RES from other Member States and third countries	0	0
(G) RES consumption adjusted for target (D)-(E)+(F)	94.98	102.57

Comparing the data in the aforementioned Table against the forecasts cited in Table 4a of the National Action Plan demonstrates the following:

- The forecasts for the RES share for heating/ cooling have been met, since the Action Plan set out that the said share would amount in 2010 and 2011 to 78 and 81 ktoe, respectively, and the said share has actually amounted to 81.25 ktoe since 2010.
- The forecast for a RES share of 16 ktoe in transports has been largely met, since a share of 15.05 ktoe was realised in 2010.

[3] Facilitates comparison with Table 4a of the NREAPs.

Table 1.b: **Total actual contribution (installed capacity, gross electricity generation) from each renewable energy technology in the Republic of Cyprus to meet the binding 2020 targets and the indicative interim trajectory for the shares of energy from renewable resources in electricity[4]**

	Year N-2 (2009)		*Year N-1 (2010)*	
	MW	***GWh***	***MW***	***GWh***
Hydro[5]:	**0**	**0**	**0**	**0**
non pumped	**0**	**0**	**0**	**0**
<1MW	**0**	**0**	**0**	**0**
1MW-10 MW	**0**	**0**	**0**	**0**
>10MW	**0**	**0**	**0**	**0**
pumped	**0**	**0**	**0**	**0**
mixed[6]	**0**	**0**	**0**	**0**
Geothermal:	**0**	**0**	**0**	**0**
Solar:	**3.35**	**3.83**	**6.6**	**6.39**
photovoltaic	**3.35**	**3.83**	**6.6**	**6.39**
concentrated solar power	**0**	**0**	**0**	**0**
Tide, wave, ocean	**0**	**0**	**0**	**0**
Wind:	**0**	**0**	**82**	**31.37**
onshore	**0**	**0**	**82**	**31.37**
offshore	**0**	**0**	**0**	**0**
Biomass[7]:	**4.25**	**26.52**	**7.9**	**35.13**
solid biomass	**0**	**0**	**0**	**0**
biogas	**4.25**	**26.52**	**7.9**	**35.13**
bioliquids	**0**	**0**	**0**	**0**
TOTAL	**7.6**	**30.35**	**96.5**	**72.89**
of which in CHP	**3.08**	**7.63**	**3.58**	**11.63**

Chart 1 below compares the aforementioned Table against Table 10 of the National Action Plan for 2010, As presented in the chart, the Republic of Cyprus has succeeded in implementing the minimum RES share in electricity for 2010, set as a target in the National Action Plan. Specifically, according to the forecast, the total installed RES power would stand at 94 MW in 2010 (of which 6 MW would come from photovoltaic, 6 MW from biomass and 82 MW from wind farms), while the actual total installed power for 2010 stood at 96.5 MW (of which 6.6. MW from photovoltaic, 7.9 MW from biomass and 82 MW from wind farms). In Chart 2, a respective comparison is made between the estimated and the actual production per RES technology in GWh for 2010, demonstrating that the Republic of Cyprus has clearly responded to the forecasts set out in the National Action Plan.

4 Facilitates comparison with Table 10a of the NREAPs.
5 Normalised in accordance with Directive 2009/28/EC and Eurostat methodology
6 In accordance with new Eurostat methodology.
7 Take into account only those complying with applicable sustainability criteria, cf. Article 5(1) of Directive 2009/28/EC last subparagraph.

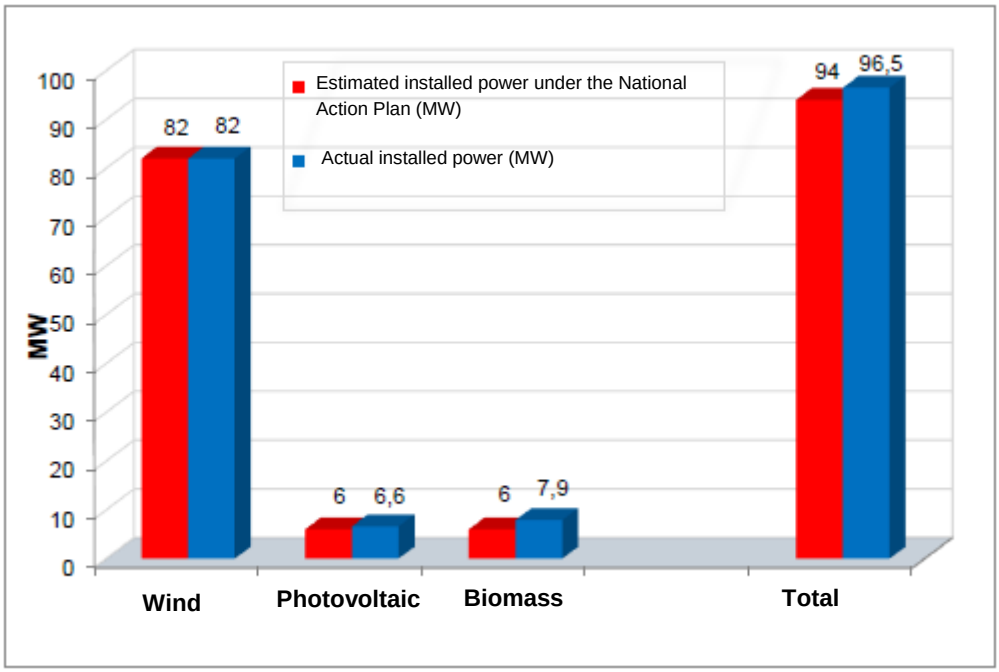

Chart 1. Estimated installed power (in MW) on the basis of the National Action Plan and actual installed power (in MW) per RES technology for 2010 in electricity

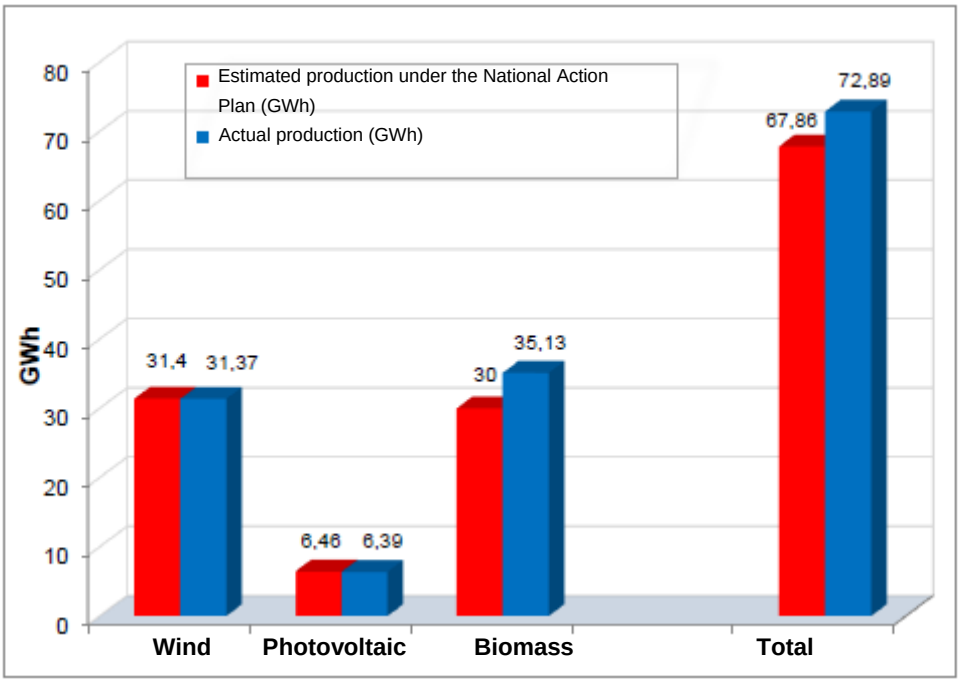

Chart 2. Estimated production (in GWh) on the basis of the National Action Plan and actual production (in GWh) per RES technology for 2010, in electricity.

Chart 3 below presents the actual installed power in MW for the years 2010 and 2011.

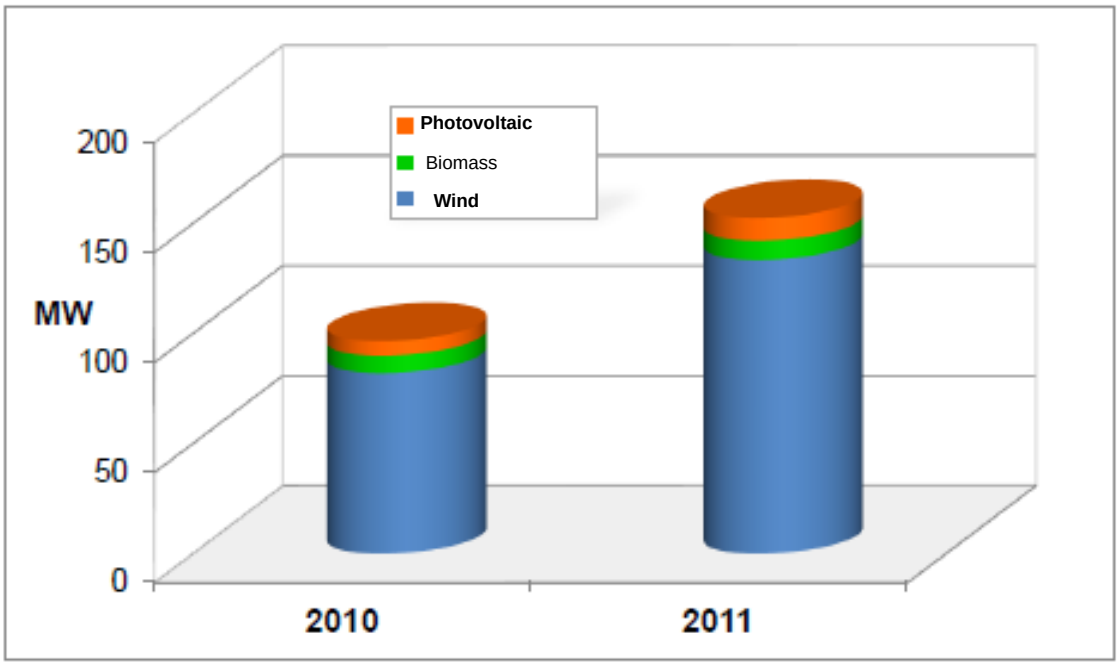

Chart 3. Actual installed power (in MW) for 2010 and 2011

Table 1c: **Total actual contribution (final energy consumption[8]) from each renewable energy technology in the Republic of Cyprus to meet the binding 2020 targets and the indicative interim trajectory for the shares of energy from renewable resources in heating and cooling (ktoe)[9]**

	Year N-2 ***(2009)***	*Year N-1* ***(2010)***
Geothermal (excluding low temperature geothermal heat in heat pump applications)	**0**	**0**
Solar	**58.20**	**61.07**
Biomass[10]:	**18.69**	**19.43**
solid biomass	**17.73**	**17.04**
biogas	**0.96**	**2.39**
bioliquids	**0**	**0**
Renewable energy from heat pumps: ***of which aerothermal*** ***of which geothermal*** ***of which hydrothermal***	**0.35**	**0.75**
TOTAL	**77.24**	**81.25**
Of which DH[11]	**0**	**0**
Of which biomass in households[12]	**7.19**	**4.81**

Chart 4 presents the comparison of the aforementioned Table against the forecasts recorded in Table 11 of the National Action Plan. The comparison demonstrates the following

- **The total RES share in heating and cooling for 2010 far exceeded the forecasts of the indicative trajectory set out in the National Action Plan for 2010 and almost stood at the expected RES share in heating/ cooling for 2011.**
- **Specifically, the forecast relating to 61.5 ktoe from solar power in 2011 (Table 11 of the National Action Plan) has been almost met since 2010, when 61.07 ktoe were produced from solar power. Moreover, both the forecast relating to the biomass share and the forecasts relating to the geothermal share for 2011 (as set out in Table 11 of the National Action Plan) have been more than met since 2010.**

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8 Direct use and district heat as defined in Article 5.4 of Directive 2009/28/EC.

9 Facilitates comparison with Table 11 of the NREAPs.

10 Take into account only those complying with applicable sustainability criteria, see Article 5(1) last subparagraph of Directive 2009/28/EC.

11 District heating and / or cooling from total renewable heating and cooling consumption (RES- DH).

12 From the total renewable heating and cooling consumption.

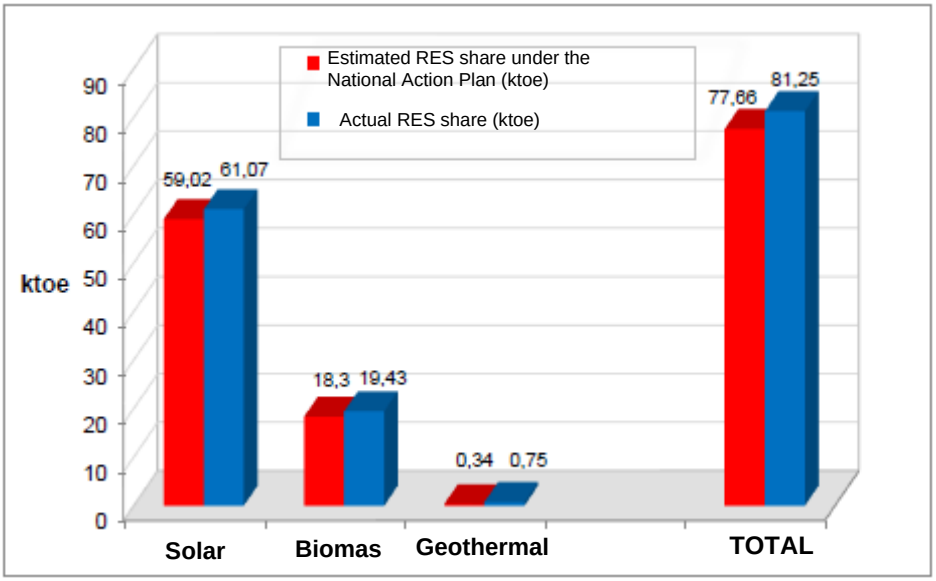

Chart 4. Estimated share (in ktoe) on the basis of the National Action Plan and actual share (in ktoe) per RES technology for 2010, in heating/ cooling

Table 1d: **Total actual contribution (final energy consumption) from each renewable energy technology in the Republic of Cyprus to meet the binding 2020 targets and the indicative interim trajectory for the shares of energy from renewable sources in the transport sector (ktoe)[13],** [fn]

	Year N-2 (2009)	Year N-1 (2010)
Bioethanol/bio-ETBE	**0**	**0**
Of which biofuels[14] Article 21(2)	**0**	**0**
Of which imported[15]	**0**	**0**
Biodiesel	**14.87**	**14.96**
Of which biofuels[16] Article 21(2)	**0.18**	**0.09**
Of which imported[17]	**8.75**	**10.22**
Hydrogen from renewables	**0**	**0**
Renewable electricity	**0**	**0**
Of which road transport	**0**	**0**
Of which non-road transport	**0**	**0**
Others (as biogas, vegetable oils, etc.) – please specify	**0**	**0**
Of which biofuels[18] Article 21(2)	**0**	**0**
TOTAL	**14.87**	**14.96**

[13] For biofuels take into account only those compliant with the sustainability criteria, see Article 5(1) last subparagraph

[14] Biofuels that are included in Article 21(2) of Directive 2009/28/EC.

[15] From the whole amount of bioethanol / bio-ETBE.

[16] Biofuels that are included in Article 21(2) of Directive 2009/28/EC.

[17] From the whole amount of biodiesel.

[18] Biofuels that are included in Article 21(2) of Directive 2009/28/EC.

2. Measures taken in the preceding two years and/or planned at national level to promote the growth of energy from renewable sources taking into account the indicative trajectory for achieving the national RES targets as outlined in your National Renewable Energy Action Plan. ***(Article 22(1)(a) of Directive 2009/28/EC)***

Table 2: **Overview of all policies and measures**

Name & reference of the measure	*Type of measure*	*Expected result*	*Targeted group and/or activity*	*Existing or planned*	*Start and end dates of the measure*
1. Installation of photovoltaic systems (PV) of a total power 1.1 MW in 65 public buildings, schools and camps	**Financial (project co-funded by the EU Structural Funds)**	**Promoting RES installation in public buildings – Exemplary role of public buildings**	**Public Services / Departments**	**Existing measure. Not included in Table 5 of the National Action Plan.**	**Start date: 2009** **End date: 2010**
2. Support scheme for accelerating the installation of PV systems of 82 MW	**Financial**	**Accelerating the installation of PV systems from 2017, as initially stated in the National Action Plan for 2012-2013**	**Households, Industries Investors, Final Consumers**	**The said measure supplements the Support Schemes listed in Table 5 of the National Action Plan**	**Start date: 2012** **End date: 2013**
3. Promoting road lighting using solar energy	**Financial and mild**	**Promoting RES and providing electrification to areas that could not be electrified in the past**	**Municipalities/ Communities**	**The said measure supplements Table 5 of the National Action Plan**	**Start date: 2011**

4. Exemption from the obligation to obtain a building permit for PV systems of a total capacity ≤ 20Kw	**Regulatory**	**Simplification of the licensing process and acceleration of the installation of small PV systems**	**Households, investors, PV system companies/ installers**	**The said measure supplements Table 5 of the National Action Plan**	**Start date: 2011**
5. Increase of the building co-efficient applicable to new buildings	**Regulatory**	**Promoting RES integration in new buildings intended for organised residential development, industrial development, etc.**	**Households, Contractors** **Industries, Undertakings**	**The said measure supplements Table 5 of the National Action Plan**	**The measure is under consultation.**
6. Obligation to replace conventional fuels in transports with biofuels by 2.4% per energy content of all fuels in transports[19]	**Regulatory**	**Increase in the biofuel proportion in transports**	**Oil companies**	**Existing measure supplementing the measures of Table 5 of the National Action Plan**	**Start date: 21/10/2011**

[19] R.A.A. 431/2011

2.a Please describe the progress made in evaluating and improving administrative procedures to remove regulatory and non-regulatory barriers to the development of renewable energy. ***(Article 22(1)(e) of Directive 2009/28/EC).***

The Republic of Cyprus has made progress in taking the following measures for improving administrative procedures and removing barriers to the promotion of RES energy:

1. **Exemption of wind farm power stations up to 30kW and photovoltaic and biomass systems up to 20 kW from the obligation to obtain construction and operation authorisation from the Cyprus Energy Regulatory Authority.**

2. **Exemption of photovoltaic systems up to 20 kW from the obligation to obtain a town planning permit, given that the systems are installed in a specific manner, and Exemption of photovoltaic systems up to 20 MW from the obligation to obtain a building permit.**

3. **At the same time, the licensing procedure for RES power plants with a total installed power up to 5 MW requires obtaining authorisation exemption, which is a simple form requesting minimal information.**

With respect to the environmental impact assessment, it is not required in the following circumstances:

- **Wind turbines with capacity up to 30 kW (a preliminary environmental impact assessment is required for wind turbines with capacity above 31 kW);**
- **Photovoltaic facilities with capacity up to 100 kW;**
- **Power generation plants using biomass, with capacity up to 20 kW;**
- **Wave energy power plants.**

Moreover, the Department of the Environment, which is the competent authority issuing the Environmental Authorisation, searches for ways to further simplify the procedures for examining applications for small PV systems, to significantly reduce their processing time.

The Transmission System Operator (TSO) accepts applications for interconnection to the Transmission System, provided that the applications are accompanied by a relevant authorisation from the Cyprus Energy Regulatory Authority (CERA). The TSO has decided that, with a view to improve administrative procedures, in the interconnection application submission phase, no town planning or other authorisation be required, so that the procedures for the remaining authorisations are carried out altogether and no delay is observed. Moreover, the TSO, in order to inform the public about the interconnection procedures for RES power plans, has posted on its website the following:

- **A template of the Interconnection Terms. The template includes the framework of interconnection terms applicable to RES electricity generation plants, as well as the operating requirements applicable to such plants.**
- **A Technical Guide containing the interconnection terms and requirements for RES electricity generation plans with the Distribution System. This Guide details all technical requirements for the interconnection and operation of RES electricity generation plans with the Distribution System.**

All competent authorities that are responsible for the authorisation and licensing of RES electricity generation plants maintain websites providing the necessary information to potential applicants, such as, for example, the application forms, the licensing procedure, a list with the applications submitted, examined, rejected etc. Moreover, certain competent licensing authorities, such as the Department of Town Planning and Housing, via its website (www.publicaccess.tph.moi.gov.cy), enables the public to monitor the main phases of the processing of their application for a town planning permit, by entering their ID Card number.

All the aforementioned measures have helped to improve the administrative procedures, to directly and timely inform the public and to accelerate the licensing process.

2. b. Please describe the measures in ensuring the transmission and distribution of electricity produced from renewable energy sources and in improving the framework or rules for bearing and sharing of costs related to grid connections and grid reinforcements *(Article 22(1)(f) of Directive 2009/28/EC).*

EAC is obliged[20], to purchase the entire energy fed into the Distribution/ Transmission Grid and produced from RES plants that are granted support or subsidy, at the rates set by CERA, provided that the technical specifications laid down in the Purchase Agreement between EAC and the producer and in the Transmission and Distribution Rules each time applicable, are met[21] .

Moreover, pursuant to the Transmission and Distribution Rules, priority shall be given to RES power stations in production dispatch. Specifically, in production dispatch, RES stations (including RES cogeneration stations) benefit from preferential treatment, provided that the safe and reliable operation of the electricity system is not adversely affected. RES stations are entitled to feed first their energy into the Transmission System and the Distribution System, in any settlement period, pursuant to the dispatch instructions. The aforementioned priority right is applicable irrespective of the installed power. It is also applicable in case of self-producers producing electricity from RES and wishing to feed any surplus into the Transmission System and the Distribution System.

Relating to the requisite new infrastructure and/or improvement of the existing Transmission Network, the TSO elaborates a 10-year Transmission System Development Plan.

[20] Decision of the Council of Ministers No 55.734 dated 30/5/2002 and Decision of the Council of Ministers No 68.201 dated 30/12/2008

[21] http://www.dsm.org.cy/media/attachments/Transmission%20and%20Distribution%20Rules/KMD_3_0_0_- _June_2011.pdf

The 10-year Plan includes all grid development projects considered necessary in order to maintain a safe and reliable system taking into consideration the new RES projects. The TSO annually revises the said 10-year Development Plan and integrates the expected production from new RES plants in the modelling, along with the grid infrastructure projects required for its connection. The annual cost of the 10-year Development Plan is included as "new additions to the regulated asset basis used for estimating the Transmission System use charges". The TSO applies the instructions/guidelines of the European Union in order to ensure that the new infrastructure projects are designed and planned to facilitate the optimal financial and functional connection of RES projects.

Within the context of encouraging the use of RES and the production of electricity from RES, CERA has determined, by a relevant Decision, the policy pertaining to the system's connection and use charges for RES producers, which is posted on the TSO's website. On the basis of the existing charging policy, the following apply:

Expenditure commitment: The cost estimation is mainly based on the shallow connection methodology. There are exceptions for cases where connection takes place in electrically remote areas. The connection cost is calculated on the basis of the technically acceptable solution with the minimum cost. With a view to further promote investments in RES, the TSO offers financial benefits in consultation with the Cyprus Energy Regulatory Authority. Thus, the connection cost is apportioned between the Transmission System Operator and the Producer on a 50%-50% basis. The Transmission System Operator covers this cost through the Use of System Charges. The Use of System Charges are assumed by all suppliers (except those relating to RES) and rolled over to their clients, in accordance with Article T16.7.2 of the Transmission and Distribution Rules. The expenditure commitment and financial incentives include all direct and indirect expenses (e.g. substation and connection line cost, cost of associated designs/plans, cost of licenses and approvals).

Expenditure allocation: TSO encourages existing wind farm applicants who wish to be connected in the same area to apply for their connection to the grid simultaneously so that the connection cost may be allocated more fairly between them. The cost is allocated on the basis of repayable cost, meaning that the first applicant assumes the connection cost and if at a later stage another applicant (RES or not) applies for connection within 5 years from the first connection, the first applicant is entitled to repayment of the part of the cost paid by subsequent applicants.

The 50%-50% policy described above applies to all cases involving the use of RES.

3. Please describe the support schemes and other measures currently in place that are applied to promote energy from renewable sources and report on any development in the measures used with respect to those set out in your National Renewable Energy Action Plan. ***(Article 22(1)(b) of Directive 2009/28/EC).***

The following 5 Support Schemes, set out in detail in the National Action Plan, were implemented in 2011:

1. **Support schemes for financial incentives in the form of state grants and/or subsidies in the sector to encourage the use of renewable energy sources and energy saving.**
2. **Subsidisation of the capital cost for project connection to the grid by 50% and subsidisation of the license acquisition cost for connection projects, also by 50%.**
3. **Cost of ancillary services**
4. **Use of System Tariffs and losses**
5. **Provision of Support for Investments for Improvement of Competitiveness and Management of Waste in Farms**

Schemes 2, 3, 4 and 5 have been implemented without any modification compared to 2010 (Analytical description of the Support Schemes is given in the National Action Plan). The Tables below present the developments in the support schemes under number 1 which were implemented in 2010 and 2011 and pertained (a) natural persons and organisations not engaged in economic activity (Table 3a), (b) natural and legal persons, as well as public bodies, engaged in economic activity (Table 3b) and (c) subsidisation of electricity from RES (Table 3c).

Table 3a: **Changes in the support schemes in 2010 and 2011 for natural persons and organisations not engaged in economic activity**

Technology	Grant for 2010	Grant for 2011
Small-scale wind farms generating electricity with a capacity of up to 30kW	55% of the eligible budget under the restriction of the maximum eligible expenditures. The maximum grant amount is EUR 50 000	55% of the eligible budget under the restriction of maximum eligible expenditures. The maximum grant amount is EUR 51 500
Central solar active domestic hot water systems.	For school commissions, as well as charity organisations, municipalities and communities and other non profit organisations not engaged in an economic activity, the grant will be 45% of the eligible budget under the restriction of maximum eligible expenditures. The maximum grant amount is EUR 25 000	For school commissions, as well as charity organisations, municipalities and communities and other non profit organisations not engaged in an economic activity, the grant will be 45% of the eligible budget under the restriction of maximum eligible expenditures. The maximum grant amount is EUR 20 000
Central solar heating and cooling systems.	For school commissions, charity organisations, municipalities and communities and other non profit organisations, the grant will be 55% of the eligible budget under the restriction of maximum eligible expenditures. The maximum grant amount is EUR 60 000. For residential units of natural persons not engaged in an economic activity the subsidy will be 55% of the eligible budget under the restriction of maximum eligible expenditures. The maximum grant amount is €25 000.	For natural persons, school commissions, charity organisations, municipalities and communities and other non profit organizations and for residential units of natural persons not engaged in an economic activity, the subsidy will be 55% of the eligible budget under the restriction of maximum eligible expenditures. The maximum grant amount is EUR 20 000 for heating systems and EUR 50 000 for heating and cooling systems.
Electricity – Heating/ Cooling Cogeneration using RES	For school commissions, as well as charity organisations, municipalities and communities and other non profit organisations not engaged in an economic activity, the grant will be 45% of the eligible budget under the restriction of maximum eligible expenditures. The maximum grant amount is EUR 85 500.	30% of the eligible budget. The maximum grant amount is EUR 160 000 per facility.

Table 3b: Changes in the support schemes in 2010 and 2011 for natural and legal persons, as well as for public entities, engaged in economic activity

Technology	Grant for 2010	Grant for 2011
Heating/ cooling generation from biomass	15% or 25% or 35% of eligible budget, according to the category of undertaking (large, medium, small). The maximum grant amount is EUR 300 000 per facility.	15% or 25% or 35% of eligible budget, according to the category of undertaking (large, medium, small). The maximum grant amount is EUR 200 000 per facility.
Biofuel production		

Table 3c: **Changes in the support schemes in 2010 and 2011 for natural persons and organisations not engaged in economic activity**

Technology	Subsidy for kilowatt/hour fed into the grid for 2010	Subsidy for kilowatt/hour fed into the grid for 2011
Residential photovoltaic systems connected to the grid.	€0.38/kWh for systems up to 20kW	€0.35/kWh for systems up to 7kW
Small-scale commercial photovoltaic systems of capacity up to 20kW, connected to the grid.	€0.36/kWh	€0.31/kWh
Large-scale commercial photovoltaic systems of capacity from 21 up to 150kW, connected to the grid.	€0.34/kWh	€0.31/kWh

Moreover, legislation was adopted in 2011 providing for the obligation to replace conventional fuels in transports with biofuels by 2.4% per energy content of all fuels in transports.

3.1. Please provide information on how supported electricity is allocated to final customers for purposes of Article 3(6) of Directive 2003/54/EC. ***(Article 22(1)(b) of Directive 2009/28/EC).***

Currently, as mentioned above under Question 2b, EAC, which is the main supplier of electricity in Cyprus, is obliged, under a Decision of the Council of Ministers and the Support Schemes, to purchase the entire energy fed into the Distribution/ Transmission grid and produced from RES plants that are granted support or subsidy, at the rates determined by CERA, provided that the technical specifications set out in the Purchase Agreement between EAC and the producer, and in the Transmission and Distribution Rules each time applicable, are met. EAC sends to the Ministry of Commerce, Industry and Tourism the monthly quantity of electricity produced from supported RES plants and publishes in its Annual Report the share of electricity from RES in total electricity generation for consumer information purposes. In addition, for being granted subsidy, all plants producing electricity from RES must submit to the Special Fund for Renewable Energy Sources and Energy Saving a guarantee of origin for the supported quantity of electricity. The Ministry of

Commerce, Industry and Tourism shall publish these data annually.

4. Please provide information on how, where applicable, the support schemes have been structures to take into account RES applications that give additional benefits, but may also have higher costs, including biofuels made from waste, residues, non-food cellulosic material, and lingo-cellulosic material. ***(Article 22(1)(c) of Directive 2009/28/EC).***

Currently, support schemes do not take into account RES applications that may give additional benefits but are potentially more expensive, such as, for example, biofuels from waste whose contribution to the target is considered to be twice that made by other biofuels. The practice applied for calculating the amount and intensity of the grant/ subsidy takes into account the following:

- **the domestic renewable energy potential per technology,**
- **the cost, maturity, efficiency, potential, development and social acceptance of each technology,**
- **safe network operation and the potential of each technology with respect to stocks.**

Specifically, for RES technologies used in electricity generation, the subsidy amount is calculated in such a way taking into account the cost of each technology, the borrowing rates, the land purchase or lease prices, the inflation rate and other parameters, so that the investment has an internal return rate of approximately 12%.

5. Please provide information on the functioning of the system of guarantees of origin for electricity and heating and cooling from RES, and the measures taken to ensure reliability and protection against fraud of the system. ***(Article 22(1)(d) of Directive 2009/28/EC).***

The Republic of Cyprus operates a system of guarantees of origin for electricity from RES but there are, currently, no thoughts about creating a system of guarantees of origin for heating and cooling from RES.

Pursuant to the Act Promoting and Encouraging the Use of Renewable Energy Sources and Energy Saving of 2006[22] , as well as the new Regulatory Decision of Cyprus Energy Regulatory Authority[23], the Cypriot legislation has fully transposed Article 15 on the guarantees of origin for electricity produced from RES.

The Transmission System Operator, as the authorised issuer, has placed in operation since December 2010 the electronic register for both the guarantees of origin from RES and the guarantees of origin from High-Efficiency Cogeneration. On 1 February 2011, the TSO issued the 1st electronic guarantee of origin for the 1st wind farm completed in Cyprus.

The TSO has taken a series of measures for ensuring the system's reliability and protection against fraud, in addition to those described in the Directive (creation of an electronic register, issue of guarantees of origin with unique identification number). First, the electronic register has been designed so as to integrate the actual measurements, as received through remote measurement, from the electricity meters installed at the RES electricity production plants. Two meters (a main meter and a control meter), certified, checked and sealed according to the applicable law, are installed in each plant producing electricity from RES. Moreover, measures preventing the insertion of electricity from conventional sources in the grid or through other interconnections have been taken in each RES plant. In addition, each plant producing electricity from RES is inspected on a regular basis to ensure that the production recorded exclusively comes from RES. Lastly, the TSO has elaborated a Technical Manual comprising the entire electronic register operating procedure and all necessary measures have been taken to ensure the controlled access to the electronic register (only by entering the authorised user's name and password), the provision of relevant documentation and a detailed control over each phase of the guarantee of origin issue procedure.

[22] Act 162(I)/2006
[23] Regulatory Decision 02/2010 by virtue of Article 21 of Act 162(I)/2006

6. Please describe the developments in the preceding 2 years in the availability and use of biomass resources for energy purposes. ***(Article 22(1)(g) of Directive 2009/28/EC).***

Table 4: **Biomass supply for energy use**

	Amount of domestic raw material IN TONS (tn)		Primary energy in domestic raw material (ktoe)		Amount of imported raw material from EU and non EU		Primary energy in amount of imported raw material from EU and non EU (ktoe)	
	Year N-2 (2009)	Year N-1 (2010)	Year N-2 (2009)	Year N-1 (2010)	Year N-2 (2009)	Year N-1 (2010)	Year N-2 (2009)	Year N -1 (2010)
Biomass supply for heating and electricity :								
Direct supply of wood biomass from forests and other wooded land for energy generation (fellings)	3 184 wood biomass	5 190 wood biomass	1.15	1.87	443 wood biomass	224 wood biomass	0.16	0.08
Indirect supply of wood biomass (residues and co-products from wood industry)	846 wood residues 9 555 Processed wood-fuel 0	858 wood residues 5 693 Processed wood-fuel 0	0.30 3.44 0	0.31 2.05 0	0 9 805 Processed wood-fuel 36 Wood pellets	0 9 537 Processed wood-fuel 330 Wood pellets	0 3.53 0.01	0 3.43 0.01
Energy crops (grasses, etc.) and short rotation trees (please specify)	0	0	0	0	0	0	0	0
products/ processed residues and fishery by-products**	130 Olive husks 4 188 Meat flours	136 Olive husks 3 245 Meat flours	0.09 1.59	0.1 1.23	3 330 Olive husks 0	0 0	2.33 0	0 0
Biomass	0	0	0	0	14 272	16 978	4.42	7.30

from waste (municipal, industrial etc.)	458 Biodegradable fraction of tyres	1 241 Biodegradable fraction of tyres	0.26	0.66	Urban waste sludge 0	Urban waste sludge 0	0	0
	0		0	0	883 Biodegradable fraction of RDF	0	0.43	0
Others (please specify)			3.24 Biogas from animal and urban waste	5.41 Biogas from animal and urban waste	0	0	0	0
Biomass supply for transport:								
Common arable crops for biofuels (please specify main types)	0	0	0	0	16 711 Biofuels from rapeseed oil, soya bean oil, palm oil, corn oil	16 813 Biofuels from. rapeseed oil, soya bean oil, palm oil, corn oil	14.87	14.96
Energy crops (grasses, etc.) and shortrotation trees for biofuels (please specify main types)	0	0	0	0	0	0	0	0
Others (please specify)	210 Biofuels from. waste cooking oil	100 Biofuels from. waste cooking oil	0.19	0.09	0	0	0	0

Table 4a: **Current domestic agricultural land use for production of crops dedicated to energy production (ha)**

Land use	Surface (ha)	
	Year N-1 (2009)	Year N-2 (2010)
1. Land used for common arable crops (wheat, sugar beat, etc.) and oil seeds (rapeseed, sunflower etc.) (Please specify main types)	*	*
2. Land used for short rotation trees (willows, poplars). (Please specify main types)	*	*
3. Land used for other energy crops such as grasses (reed canary grass, switch grass, Miscanthus), sorghum. (Please specify main types)	*	*

*** Agricultural land was not used for dedicated energy production in 2009 and 2010..**

7. Please provide information on any changes in commodity prices and land use within your Member State in the preceding 2 years associated with increased use of biomass and other forms of energy from renewable sources. Please provide where available references to relevant documentation on these impacts in your country. ***(Article 22(1)(h) of Directive 2009/28/EC).***

We have not received knowledge of any changes in commodity prices and land use associated with the increased use of biomass and other forms of energy from RES in 2009 and 2010, because no agricultural land was used in Cyprus for energy crops or crops exclusively dedicated to energy purposes. The reason is that the agricultural sector of Cyprus cannot support the energy exploitation of significant amounts of products or by-products from agriculture and forestry, mainly due to the water problem the island is confronted with and the lack and multi-segmentation of agricultural land. In addition, the absence of large quantities of forest biomass does not leave much room for exploiting forest biomass for energy purposes. Therefore, it is a fact that, in Cyprus, the majority of domestic agricultural products and by-products are used in food and feed and not for energy purposes.

Moreover, the Republic of Cyprus promotes the use of, as a raw material for producing energy from biomass, animal, urban and industrial waste and, therefore, there has not been, nor there is expected to be, in the near future, any significant impact on other sectors that are based on agriculture and forestry due to the energy needs of Cyprus, which could lead to a change in the commodity prices or land uses.

8. Please describe the development and share of biofuels made from wastes, residues, non-food cellulosic material and ligno cellulosic material. ***(Article 22(1)(i) of Directive 2009/28/EC).***

Very small amounts of biofuels were produced in Cyprus in 2009 and 2010 from waste vegetable oils included in the list of waste, whose contribution to the target is considered to be twice that made by the other biofuels, pursuant to Article 21(2) of Directive 2009/28/EC. The said quantities are presented in the Table below.

Table 5: Production and consumption of biofuels of Article 21(2) (ktoe)

Article 21(2)[24] biofuels	*Year N -2* (2009)	*Year N -1* (2010)
Production – **biofuel from waste vegetable oils**	**0.26**	**0.09**
Consumption – **biofuel from waste vegetable oils**	**0.26**	**0.09**
Total production of Article 21(2) biofuels	**0.26**	**0.09**
Total consumption of Article 21(2) biofuels	**0.26**	**0.09**
% share of Article 21(2) biofuels in total RES-T	**1.7%**	**0.6%**

9. Please provide information on the estimated impacts of the production of biofuels and bioliquids on biodiversity, water resources, water quality and soil quality within your country in the preceding 2 years.

No biofuels and bioliquids were produced in Cyprus in 2009-2010 from domestic biomass and, therefore, no impacts on biodiversity, water resources, water quality and soil quality have been identified. The production depended exclusively on imported raw materials processed in Cyprus and a small quantity of domestic waste vegetable oils.

10. Please estimate the net greenhouse gas emission savings due to the use of energy from renewable sources (Article 22(1)(k) of Directive 2009/28/EC).

Annex I describes analytically the methodology used for calculating the net greenhouse gas emission savings due to the use of renewable energy in the sectors of electricity, heating/ cooling and transports.

Table 6: **Estimated GHG emission saving from the use of renewable energy (t CO2 eq)**

Environmental aspects	Year N-2 (2009)	Year N-1 (2010)
Total estimated net GHG emission saving from using renewable energy	***280 795***	***309 844***
- Estimated net GHG saving from the use of renewable electricity	**8 521**	**20 548**
- Estimated net GHG saving from the use of renewable energy in heating and cooling	**253 898**	**268 640**
- Estimated net GHG saving from the use of renewable energy in transport	**18 376**	**20 656**

[24] Biofuels made from wastes, residues, non-food cellulosic material and lignocellulosic material.

11. Please report on (for the preceding 2 years) and estimate (for the following years up to 2020) the excess/ deficit production of energy from renewable sources compared to the indicative trajectory which could be transferred to/ imported from other Member States and/or third countries, as well as estimated potential for joint projects until 2020 ***(Article 22(1)(m) of Directive 2009/28/EC).***

The Republic of Cyprus aims to achieve its binding targets on renewable energy sources using only domestic production and is not expected to use the cooperation mechanisms. However, it does not exclude mainly the possibility to participate in joint projects with other Member States and third countries.

Table 7: **Actual and estimated excess and/or deficit (-) production of renewable energy compared to the indicative trajectory which could be transferred to/ imported from other Member States and/or third countries in the Republic of Cyprus (ktoe)[25], [26]**

	Year N-2 (2009)	Year N-1 (2010)	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Actual/estimated excess or deficit production (Please distinguish per type of renewable energy and per origin/destination of import/export)	**0**	**-11.43**	**33**	**39**	**34**	**46**	**30**	**42**	**57**	**34**	**21**	**0**

The small deficit in ktoe recorded in Table 7 for 2010 results from comparison between the actual RES rate for the year and the rate stated in Table 4a of the National Action Plan and not the indicative trajectory set out in Annex I to Directive. The estimated surplus recorded for the years 2011-2019 coincides with that of Table 9 of the National Action Plan, since, at this phase, the estimates made by Cyprus as regards to the calculation and production of energy from renewable sources as compared to the National Action Plan have not changed.

[25] Please use actual figures to report on the excess production in the two years preceding submission of the report, and estimates for the following years up 2020. In each report Member State may correct the data of the previous reports.

[26] When filling in the table, for deficit production please mark the shortage of production using negative numbers (e.g. –x ktoe).

11.1 Please provide details of statistical transfers, joint projects and joint support scheme decision rules.

Currently, no national procedures have been established for arrangements relating to statistical transfer or joint projects and/or joint support schemes, but legislation is being elaborated (that is expected to be adopted at the end of 2012 - beginning of 2013) which describes the procedures governing decision-making on joint projects, statistical transfers and joint support schemes.

12. Please provide information on how the share of biodegradable waste in waste used for producing energy has been estimated, and what steps have been taken to improve and verify such estimates ***(Article 22(1)(n) of Directive 2009/28/EC).***

No electricity is currently produced in Cyprus from household waste.

Please note that in the first progress report (2011 report) Member States are invited to outline their intentions with regard to the questions addressed in Article 22(3)(a) to (c). In addition, Member States are also welcome to provide any other information considered relevant to the specific situation of developing renewable energy of each Member State.

13. <u>Article 22(3)(a):</u> ***The Member State shall outline whether it intends to establish a single administrative body responsible for processing authorisation, certification and licensing applications for renewable energy installations and providing assistance to applicants.***

Currently, there are no plans for the creation of a single administrative body responsible for processing authorisation, certification and licensing applications for renewable energy installations. However, a Committee has been established since 2002, by a decision of the Council of Ministers[27], comprising all Services/ Departments/ Independent Authorities that are competent to issue all necessary authorisations, which is generally coordinated by the Ministry of Commerce, Industry and Tourism that has competence over energy issues.

[27] Decision of the Council of Ministers No 55.734 dated 30/5/2002

14. **Article 22(3)(b)** ***The Member State shall outline whether it intends to provide for automatic approval of planning and permit applications for renewable energy installations where the authorising body has not responded within the set time limits.***

The Republic of Cyprus does not currently intend to adopt such a measure.

15. **Article 22(3)(c):** ***The Member State shall outline whether it intends to indicate geographical locations suitable for exploitation of energy from renewable sources in land-use planning and for the establishment of district heating and cooling.***

The Town and Land-Use Planning Act was amended in 1982 by the adoption of the Statement of Policy, which constitutes a generalised land-use and town planning framework.

The Statement of Policy currently consists of a written text, with attached explanatory maps and diagrams, which includes general and specific policies per thematic unit and type of development (including renewable energy sources). Additionally, the detailed Town Planning Zone plans and other special documents published in administrative regions are also an integral part of the Statement of Policy. In certain administrative regions only the Development Limit is specified and not the Planning Zones while in other regions the Development Limit arises through interpretation of the provisions of the written text of the Statement of Policy.

Moreover, by virtue of Article 6 of the Town and Land-Use Planning Act, the Minister for Interior issued Order No 2[28] , relating to the siting of RES plants, while, in 2009 an amended text of the Statement of Policy [29] and an amendment to the aforementioned Order[30] were adopted.

Moreover, the Town Planning and Housing Department has prepared a Recommendatory/ Indicative Map for wind farm development.

[28] Order No 2 dated 2006 of the Minister for the Interior.
[29]http://www.moi.gov.cy/MOI/tph/tph.nsf/All/5510F83A5EF3B394C225783E00495030/$file/Tropopoiisi_keimenoy_Dilosis_Politikis_2009.pdf
[30] Amendment to Order No 2 dated 19/03/2009

ANNEX I

Description of methodology applied for estimating the net greenhouse gas emission saving due to the use of (a) electricity from renewable energy sources, (b) renewable energy sources for heating and cooling and (c) renewable energy sources in transports.

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1. Introduction

The estimate of the net greenhouse gas emission saving due to use of (a) electricity from renewable energy sources and (b) renewable energy sources for heating and cooling has been made by the Department that is competent to calculate greenhouse gas emissions, the Department of the Environment of the Ministry of Agriculture, Natural Resources and Environment. The estimate of the net greenhouse gas emission saving due to the use of renewable energy in transports have been made by the Energy Service of the Ministry of Commerce, Industry and Tourism.

2. Methodology

The steps applied for calculating (a) and (b) are as follows:

(a) Collection of consumption data for renewable energy.

(b) Collection of data for energy sources that would be used if no renewable energy sources were used.

(c) Collection of greenhouse gas emission co-efficients for energy sources that would be used if no renewable energy sources were used.

(d) Conversion of energy consumption into TJ.

(e) Calculation of greenhouse gas emissions.

(f) Conversion of greenhouse gas emissions into tons of carbon dioxide equivalent.

(g) Calculation of the total.

The net greenhouse gas emission reduction (saving) due to the use of biofuels in road transports was calculated as the difference between the emissions produced if the biofuel quantity was diesel and if the said quantity was a biodiesel mixture in specific proportions, by using the typical greenhouse gas emission reduction values listed in Annex V, Parts A and B, to Directive 2009/28/EC.

The steps followed for the calculation are detailed as follows:

1. The quantity of biofuels consumed in transports was converted from toe into TJ.

2. The greenhouse gas emissions from the aforementioned quantity were estimated considering that this quantity is a conventional fuel (petrol or diesel). Currently, in Cyprus, only biodiesel is mixed into diesel and, therefore, the said quantity was considered to be diesel.

3. After calculating the greenhouse gas emissions from the aforementioned diesel quantity, the net greenhouse gas emission reduction was calculating, considering that this quantity is a mixture of biofuels in a specified proportion, using for each biofuel the typical greenhouse gas emission reduction value listed in Annex V, Parts A and B, to Directive 2009/28/EC.

while for calculating greenhouse gas emissions for diesel, the co-efficient 74 t CO2/TJ was used.

3. Results

(a) Collection of consumption data for renewable energy.

The source of renewable energy consumption data is the national energy balance, which is annually elaborated by the Energy Service of the Ministry of Commerce, Industry and Tourism[31]. The data for the years 2009 and 2010 are presented in Table 1 according to the consumers.

With regard to the biomass, it is stated as follows:

- **The biomass consumed by the cement plant is solid and liquid waste.**
- **The biomass used for heating purposes in households and services comes from wood and wood residues, except than a small quantity that comes from olive husks (waste), amounting to 94 and 96 toe in 2009 and 2010, respectively.**

[31] Energy Service, 2012, National Energy Balance 2009/ 2010, Ministry of Commerce, Industry and Tourism.

- **The biomass used for cooking purposes was charcoal.**
- **The biomass in agriculture comes from heat and electricity cogeneration from the anaerobic livestock waste processing stations.**
- **The biomass in industry comes from wood residues.**

Table 1. Consumption of renewable energy in 2009 and 2010 in toe.

Electricity (toe)	**2009**	**2010**
Electricity from biomass	**2 281**	**3 021**
• Consumed in agriculture	**573**	**888**
• Fed into the electricity grid	**1 707**	**2 133**
Electricity from photovoltaic	**330**	**550**
• Consumed in the household sector	**80**	**134**
• Fed into the electricity grid	**250**	**416**
Electricity from wind power	**0**	**2 698**
• Fed into the electricity grid	**0**	**2 698**
Total	**2 610**	**6 268**

Thermal energy (toe)	**2009**	**2010**
Solar	**58 207**	**61 070**
• Hot water	**51 359**	**52 942**
• Space heating	**6848**	**8 128**

Geothermal	**351**	**753**
• Consumed in the household sector	**351**	**753**
Biomass	**18 685**	**19 430**
• Cement industry	**6 705**	**9 194**
• Tertiary sector for heating	**3 771**	**2 087**
• Tertiary sector for cooking	**6 970**	**5 483**
Agriculture	**959**	**2 386**
Industry	**280**	**280**
Total	**77 244**	**81 253**

(b) Collection of data for energy sources that would be used if no renewable energy sources were used.

It has been considered that if no RES were used, the energy produced would come from the sources presented in Table 2. The data for cement industry are based on the annual reports submitted by the facility under Act No 110(I)/2011[32] for 2009 and 2010.

Table 2. Sources of energy that would be used if no renewable energy sources were used in 2009 and 2010 in %.

Electricity	**Electricity**	**Diesel fuel**	**Pet coke**	**Fuel oil**	**LPG**
Agriculture, household sector, industry, services	**100%**				

Thermal energy (toe)					

[32] The Act on the Establishment of a Scheme for Greenhouse Gas Emission Allowances Trading of 2011 (No 110(I)/2011

Solar – hot water	**100%**				
Solar – space heating		**100%**			
Geothermal		**100%**			
Biomass					
Cement industry (2009)			**84.32%**	**15.48%**	**0.2%**
Cement industry (2010)		**0.2%**	**82.9%**	**9.6%**	**7.0%**
Household sector (cooking)	**100%**				
Agriculture, household sector (heating), industry, services		**100%**			

(c) Collection of greenhouse gas emission co-efficients for energy sources that would be used if no renewable energy sources were used.

The greenhouse gas emission co-efficients that have been used for calculating emissions are presented in Table 3.

Table 3. Greenhouse gas emission co-efficients per gas, 2009 and 2010 in kg/TJ.

Emission co-efficient (kg/TJ)	**2009**	**2010**	**Source**
Electricity production			
CO_2	**77 721**	**78 047**	**Annual report of the facility[a] ETS**

CH_4	3	3	IPCC 1996 GHG guidelines[b]
N_2O	06	06	IPCC 1996 GHG guidelines[c]
Cement production			
Diesel	74 000	74 000	Annual ETS report of the facility[δ]
Petcoke	94 130	93 300	Annual ETS report of the facility[δ]
RFO	78 710	78 870	Annual ETS report of the facility[δ]
LPG	63 000	63 000	Annual ETS report of the facility[δ]

CH_4	2	2	IPCC 1996 GHG guidelines[e]
N_2O	06	06	IPCC 1996 GHG guidelines[c]
Industry (diesel)			
CO_2	73 326	73 326	IPCC 1996 GHG guidelines[f]
CH_4	3	3	IPCC 1996 GHG guidelines[e]
N_2O	06	06	IPCC 1996 GHG guidelines[c]
Services, households, agriculture			
CO_2	73 326	73 326	IPCC 1996 GHG guidelinesf

CH_4	10	10	IPCC 1996 GHG guidelines[g]
N_2O	06	06	IPCC 1996 GHG guidelines[c]

*** Pursuant to the Act on the Establishment of a Scheme for Greenhouse Gas Emission Allowance Trading of 2011 (Act 110(I)/2011). It has been calculated by dividing the total CO2 emissions by the total electricity production for the year, from the three electricity production facilities.**

[b] IPCC, 1996, Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories, reference manual, pg. 1.35, oil, energy industries.

[c] IPCC, 1996, Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories, reference manual, pg. 1.36, oil.

[d] Pursuant to the Act on the Establishment of a Scheme for Greenhouse Gas Emission Allowance Trading of 2011 (Act 110(I)/2011). The co-efficients used by the cement facility that uses biomass.

[e] IPCC, 1996, Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories, reference manual, pg. 1.35, oil, manufacturing industries and construction.

[f] IPCC, 1996, Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories, reference manual, pg 6, table 1-2 gas/diesel oil multiplied by default fraction of carbon oxidised of 0.99 and by 44/12, table 1-4 pg. 1.8.

[g] IPCC, 1996, Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories, reference manual, pg. 1.35, oil, other sectors (stationary).

(d) Conversion of energy consumption into TJ.

Energy consumption has been converted from toe to TJ by applying the following formula:

$$ECTJ = ECtoe \times 41.868 / 1000$$

where ECTJ is energy consumption in TJ, ECtoe is energy consumption in toe and 41.868 is the conversion co-efficient from ktoe to TJ[33].

(e) Calculation of greenhouse gas emissions

Greenhouse gas emissions have been calculated by applying the following formula:

[33] IPCC, 1996, Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories, introduction, pg 5

GHGx = EFx x ECTJ / 1000

where GHGx is the emissions of the greenhouse gas x in tons, EFx is the co-efficient of the greenhouse gas x in kg/TJ and ECTJ is energy consumption in TJ.

The results of the application of the aforementioned formula are presented in Table 4.

Table 4. Greenhouse gas emission saving due to use of renewable energy in 2009 and 2010 in CO_2 tons, CH_4 tons, and N_2O tons.

	2009 (t)			2010 (t)		
Electricity	**CO_2**	**CH4**	**N2O**	**CO_2**	**CH4**	**N2O**
Electricity from biomass						
• **Consumed in agriculture**	**1 866**	**0.07**	**0.01**	**2 901**	**0.11**	**0.02**
• **Fed into the electricity grid**	**5 555**	**0.21**	**0.04**	**6 970**	**0.27**	**0.05**
Electricity from photovoltaic						
• **Consumed in the household sector**	**259**	**0.01**	**0.002**	**437**	**0.02**	**0.00**
• **Fed into the electricity grid**	**814**	**0.03**	**0.01**	**1 360**	**0.05**	**0.01**
Electricity from wind						

power						
• Fed into the electricity grid	0.00	0.00	0.00	8 816	0.34	0.07
Total	8 494	0.33	0.07	20 483	0.79	0.16
Thermal energy						
Solar						
• Hot water	167 124	6.5	1.3	172 998	6.6	1.3
• Space heating	21 023	2.9	0.2	24 953	3.4	0.2
Geothermal						
• Consumed in the household sector	1 078	0.1	0.01	2 312	0.3	0.02
Biomass						
• Cement industry	25 737	0.6	0.2	34 946	0.8	0.2
• Tertiary sector for heating	11 577	1.6	0.1	6 407	0.9	0.1
• Tertiary sector for cooking	22 681	0.9	0.2	17 917	0.7	0.1
Agriculture	2 944	0.4	0.02	7 324	1.0	0.1
Industry	860	0.1	0.01	860	0.1	0.01
Total	253 024	13.0	1.9	267 717	13.8	2.0

(f) Conversion of greenhouse gas emissions into tons of carbon dioxide equivalent.

To calculate greenhouse gas emission saving due to use of renewable energy in 2009 and 2010 in tons of CO_2 equivalent, CH_4 and N_2O emissions were multiplied by the global warming potential of each gas. The co-efficient of methane is 21 and for dinitrogen monoxide is 310[34]. Table 5 presents greenhouse gas emission saving due to the use of renewable energy in 2009 and 2010 in tons of CO_2 equivalent for each gas.

Table 5. Greenhouse gas emission saving due to use of renewable energy in 2009 and 2010 in tons of CO_2 equivalent.

	2009 (t CO2 eq.)			2010 (t CO2 eq.)		
Electricity	**CO_2**	**CH4**	**N2O**	**CO_2**	**CH4**	**N2O**
Electricity from biomass						
• **Consumed in agriculture**	**1 866**	**1.5**	**4.5**	**2 901**	**2.3**	**6.9**
• **Fed into the electricity grid**	**5 555**	**4.5**	**13.3**	**6 970**	**5.6**	**16.6**
Electricity from photovoltaic						
• **Consumed in the household sector**	**259**	**0.2**	**0.6**	**437**	**0.4**	**1.0**
• **Fed into the electricity grid**	**814**	**0.7**	**1.9**	**1 360**	**1.1**	**3.2**
Electricity from wind power						

[34] IPCC, 1996, Climate Change 1995: A report of the Intergovernmental Panel on Climate Change, Second Assessment Report of the Intergovernmental Panel on Climate Change, IPCC

• Fed into the electricity grid	0	0.0	0.0	8 816	7.1	21.0
Total	8 494	7	20	20 483	17	49
Thermal energy						
Solar						
• Hot water	167 124	135.5	400.0	172 998	139.6	412.3
• Space heating	21 023	60.2	53.3	6 805	71.5	63.3
Geothermal						
• Consumed in the household sector	1 078	3.1	2.7	2 312	6.6	5.9
Biomass						
• Cement industry	25 737	11.8	52.2	34 946	16.2	71.6
• Tertiary sector for heating	11 577	33.2	29.4	6 407	18.3	16.3
• Tertiary sector for cooking	22 681	18.4	54.3	17 917	14.5	42.7
Agriculture	2 944	8.4	7.5	7 324	21.0	18.6
Industry	860	2.5	2.2	860	2.5	2.2
Total	253 024	273	602	267 717	290	633

(g) Calculation of the total.

Greenhouse gas emission saving due to use of renewable energy in 2009 and 2010 was as follows:

From the use of electricity produced from renewable sources: 8 521 t CO_2 eq. in 2009 and 20 548 t CO_2 eq. in 2010.

From the use of renewable energy sources for heating and cooling: 253 898 t CO_2 eq. in 2009 and 268 640 t CO_2 eq. in 2010.

The aforementioned data are presented in detail in Table 6.

Table 6. Total greenhouse gas emission saving due to use of renewable energy in 2009 and 2010 in tons of CO_2 equivalent.

	2009 (t CO_2 eq.)	2010 (t CO_2 eq.)
Electricity		
Electricity from biomass		
• **Consumed in agriculture**	**1 872**	**2 910**
• **Fed into the electricity grid**	**5 573**	**6 992**
Electricity from photovoltaic		
• **Consumed in the household sector**	**260**	**438**
• **Fed into the electricity grid**	**817**	**1 364**
Electricity from wind power		
• **Fed into the electricity grid**	**0**	**8 844**
Total	**8 521**	**20 548**

Thermal energy		
Solar		
• Hot water	**167 660**	**173 550**
• Space heating	**21 137**	**25 088**
Geothermal		
• Consumed in the household sector	**1 084**	**2 325**
Biomass		
• Cement industry	**25 801**	**35 034**
• Tertiary sector for heating	**11 640**	**6 442**
• Tertiary sector for cooking	**22 753**	**17 974**
Agriculture	**2 960**	**7 364**
Industry	**864**	**864**
Total	**253 898**	**268 640**

Calculation of greenhouse gas emission saving due to the use of renewable energy sources in transports.

First of all, it has been regarded that the quantities of other greenhouse gases produced in transports are negligible and, therefore, only the saving of CO_2 quantities has been calculated.

For 2009:

15 131 toe of biofuels were consumed in 2009, which consisted, according to information provided to the Energy Service, in soya bean oil biodiesel by 80% and palm oil biodiesel by 20%.

15 131 toe x 41 868/1 000 = 633.5 TJ

and 633.5 TJ x 74 t CO2/TJ = 46 879 t CO2

However, given that, instead of the diesel producing 468 79 t CO2 emissions, biofuels have been used, the emissions from the mixture of biofuels is the sum of reductions resulting from each biofuel, taking into account the typical average reduction in the greenhouse gas emissions for the said biofuel (Annex V, Parts A and B, to Directive 2009/28/EC) and its proportion in the mixture, i.e.

46 879 x biofuel percentage in the mixture x typical greenhouse gas emission reduction value = t CO2,

Soya bean oil biodiesel 46 879 x 80% x 40%= 15 001 t CO2

Palm oil biodiesel 46 879 x 20% x 36%= 3 375 t CO2

Total reduction in greenhouse gas emissions = 18 376 t CO2

For 2010:

15 049 toe of biofuels were consumed in 2010, which consisted, according to information provided to the Energy Service, in soya bean oil biodiesel by 30%, palm oil biodiesel by 20%, rapeseed oil biodiesel by 30% and sunflower oil biodiesel by 20%.

15 049 toe x 41 868/1 000 = 630.1 TJ

630.1 TJ x 74 t CO2/TJ = 46 627 t CO2

However, given that, instead of diesel, biofuels have been used, the greenhouse gas emission reduction from the mixture of biofuels is:

Soya bean oil biodiesel	**46 627 x 30% x 40%= 5 595 t CO2**
Palm oil biodiesel	**46 627 x 20% x 36%= 3 357 t CO2**
Rapeseed oil biodiesel	**46 627 x 30% x 45%= 6 295 t CO2**
Sunflower oil biodiesel	**46 627 x 20% x 58%= 5 409 t CO2**

Total greenhouse gas emission reduction = 20 656 t CO2

Please note that, given that in 2009 and 2010 the suppliers of fuels for transports were not obliged to declare to the competent authority the types of biofuels that mix into the conventional fuels for transports, the proportions used for the aforementioned calculation are given approximately.